

## CLAIMS

1. A cartridge for counting and discriminating a plurality of types of blood cells in a blood sample in one counting operation, comprising a housing with  
a first mixing chamber,  
5 first cell characterization means for characterizing cells passing through the first orifice,  
a bore in the outer surface of the housing for entrance of the blood sample,  
communicating with  
a first sampling member positioned in the housing for sampling the blood sample and  
10 having a first cavity for receiving and holding the blood sample, the member being movably positioned in relation to the housing in such a way that, in a first position, the first cavity is in communication with the bore for entrance of the blood sample into the first cavity, and, in a second position, the first liquid storage chamber communicates through the first cavity with the first mixing chamber so that the blood sample can be  
15 flushed with discharged liquid from the first liquid storage chamber into the first mixing chamber  
c h a r a c t e r i z e d in that the cartridge further comprises  
a first liquid storage chamber for holding a lysing reagent with a lysing capability sufficient for lysing of erythrocytes while maintaining counting ability of other blood  
20 cell types, and  
a first collection chamber separated by a wall from the first mixing chamber, the wall containing a first orifice for the passage of the cells between the first mixing chamber and the first collection chamber, and in that  
the first cell characterization means is adapted for characterization of the particles  
25 passing through the first orifice.
2. A cartridge according to claim 1, wherein the lysing reagent contains a surfactant.
3. A cartridge according to claim 1 or 2, wherein the surfactant comprises a saponin.
4. A cartridge according to claim 1, wherein the lysing reagent comprises a quaternary ammonium salt.

5. A cartridge according to any of the preceding claims, wherein cells of the other cell types are reduced in size and the concentration is determined by counting a representative fraction of the respective cells.
6. A cartridge according to any of the preceding claims, wherein the other cell types include sub-populations of leukocytes, such as lymphocytes, monocytes and granulocytes, which are selectively reduced in size by the lysing reagent and can be counted in a cell counter.
7. A cartridge according to any of the preceding claims, further comprising a second mixing chamber and a second collection chamber separated by a second wall containing a second orifice for the passage of the cells between the second mixing chamber and the second collection chamber, second cell characterization means for characterizing cells passing through the second orifice, and wherein in the second position, the first cavity is in communication with the first mixing chamber for entrance of liquid from the first mixing chamber into the first cavity, and, in a third position, the first cavity is in communication with the second mixing chamber for discharge of the liquid in the first cavity into the second mixing chamber.
8. A cartridge according to any of claims 1-6, further comprising a second mixing chamber and a second collection chamber separated by a second wall containing a second orifice for the passage of the cells between the second mixing chamber and the second collection chamber, second cell characterization means for characterizing cells passing through the second orifice, and a second sampling member positioned in the housing for sampling a small and precise volume of liquid from the first mixing chamber and having a second cavity for receiving and holding the sampled liquid, the member being movably positioned in relation to the housing in such a way that, in a first position, the second cavity is in communication with the first mixing chamber for entrance of liquid from the first mixing chamber into the first cavity, and, in a second position, the second cavity is in communication with the second mixing chamber for discharge of the sampled liquid in the second cavity into the second mixing chamber.

9. A cartridge according to any of the preceding claims, further comprising a reagent chamber positioned adjacent to the first mixing chamber for holding a reagent to be entered into the first mixing chamber.
10. A cartridge according to claim 9, further comprising a breakable seal separating  
5 the reagent chamber from the first mixing chamber.
11. A cartridge according to any of the preceding claims, wherein a mixing member is positioned in at least one of the mixing chambers.
12. A cartridge according to any of the preceding claims, further comprising a sensor for characterization of the liquid.
- 10 13. A cartridge according to claim 12, wherein the sensor for characterization of the liquid is adapted for spectrophotometric characterization of the liquid.
14. A cartridge according to any of the preceding claims, wherein the orifice has a diameter in the range from 30  $\mu\text{m}$  to 100  $\mu\text{m}$ .
- 15 15. A cartridge according to claim 14, wherein the orifice has a diameter in the range from 35  $\mu\text{m}$  to 50  $\mu\text{m}$ .
16. A cartridge according to claim 15, wherein the orifice has a diameter in the range from 30  $\mu\text{m}$  to 45  $\mu\text{m}$ .
17. A cartridge according to claim 16, wherein the orifice has a diameter in the range from 35  $\mu\text{m}$  to 40  $\mu\text{m}$ .
- 20 18. A cartridge according to claim 17, wherein the orifice has a diameter substantially equal to 40  $\mu\text{m}$ .